

REMARKS

Claim 1 has been cancelled. New claims 4-23 have been added. Support for these new claims is found in the specification as filed, for example as set forth below.

Claim	Location
4	Page 7, line 7
5	Page 4, line 27; page 5, line 11
6	Page 3, line 8
7	Page 7, line 30
8	Page 7, line 30
9	Page 8, line 1
10	Page 3, line 8
11	Page 4, line 26
12	Page 5, line 9
13	Page 5, line 10
14	Page 5, line 27
15	Page 5, line 32
16	Page 6, line 7
17	Page 6, line 15
18	Page 6, line 25
19	Page 4, line 14
20	Page 4, line 14
21	Page 4, line 20
22	Page 8, line 12
23	Page 8, line 12

REJECTIONS UNDER 35 U.S.C. § 112

The Examiner has rejected claims 2 and 3 under 35 U.S.C. § 112 as being indefinite for failing to particularly point out and distinctly claim the subject matter that Applicants regards as the invention.

Claim 2 has been amended to provide antecedent basis for “polymerization.” Claim 3 has been amended to clarify that the band element comprises the encapsulated reactant. Applicants believe that amended claims 2 and 3 comply with all requirements of 35 U.S.C. 112, second paragraph.

REJECTIONS UNDER 35 U.S.C. § 102

Claims 1 and 2 have been rejected as anticipated by U.S. Published Patent Application 2004/0007784 A1 to Skipor. Claim 1 has been cancelled, rendering this

rejection moot as it pertains to Claim 1. Claim 1 has been rejected as anticipated by U.S. Pat. No. 6,058,994, DE Pat. No. 19754341, (which is apparently equivalent to U.S. Published Application No. 2003/0165682 A1), and JP Pat. No. 2000-211324. The cancellation of Claim 1 has rendered these rejections moot.

Amended claim 2 recites a process for forming tire band elements having improved durability, the process comprising the steps of providing a tire band element matrix; encapsulating a reactant to form microcapsules, where the reactant is capable of undergoing polymerization within the matrix; selecting a reaction facilitator capable of facilitating the polymerization of the reactant; and adding the microcapsules and the reaction facilitator to the tire band element matrix.

In contrast, the '784 publication teaches a self-healing polymer composition containing microcapsules of polymerizable material that have a polymerization agent attached to the outer surface of the microcapsule. The '784 publication suggests that the self-healing polymer composition can be used in a number of applications, and provides a long list at paragraph 54, including tire parts. However, for a number of reasons detailed below, this broad statement cannot be interpreted as anticipating the tire band elements of claim 2.

It is well-established that a genus does not always anticipate a claim to a species, unless the species is clearly named. M.P.E.P. 2131.02. In the present case, "tire parts" does not clearly name "band elements." One of skill in the art of tires would understand that the various components and parts of tires are widely diverse in composition, methods of production, functions, and chemical and physical properties. For example, some parts of tires comprise vulcanized elastomeric compositions, some parts comprise metal, and some comprise woven fiber. To suggest that microcapsules of polymerizable material are useful in "tire parts" falls far short of teaching a process for forming tire band elements.

Furthermore, the '784 publication includes a laundry list of shaping technology that may be used to form the self-healing polymer composition into various shapes. As part of this list, the '784 publication includes "compression molding (such as for making electrical and electronic goods, knobs, buttons, closures, eating utensils, tire parts, and so forth)..." Although the '784 publication generally refers to tire parts, one of skill in the art would understand this extremely broad and vague teaching to be more

practically limited to tire parts that are conventionally compression molded. Band elements, on the other hand, are not compression molded. Therefore, Applicants believe that claim 2, as amended, is not anticipated by the '784 publication.

REJECTIONS UNDER 35 U.S.C. § 103

Claims 1-3 have been rejected as unpatentable under 35 U.S.C. 103(a) over at least one of U.S. Pat. No. 6,405,773 or 4,734,144 in view of at least one of U.S. Pat. No. 6,518,330 or U.S. Published Application No. 2004/0007784.

The '773 patent and '144 patent are relied upon by the Examiner as teaching conventional banded tires containing a band element, and having a concern about cracking in the band. Microencapsulated reactants are not taught or suggested. The '330 patent teaches self-healing composite materials, but does not teach their use in tire components. The '784 patent also teaches self-healing composite materials, but does not teach their use in tire band elements. The Examiner states that it would have been obvious to modify the known crack-susceptible composite bands in banded tires so that they would have the ability to self-heal. Applicants have carefully considered this rejection, and respectfully disagree.

In order to combine two or more references to establish a *prima facie* case of obviousness, there must be a suggestion or motivation to combine the reference teachings, and a reasonable expectation of success.¹ The '773 patent teaches a run flat tire band in which two distinctly different groups of fibers are arranged in such a manner as to provide a decrease in circumferential stiffness through the thickness of the band and a gradual increase in interlaminar shear strength toward the center axis of the band.² This increase in interlaminar shear strength and in circumferential strength reduces failure of the band.³ The '773 patent does not teach or suggest modifying the band element to incorporate the self-healing composition of the '330 patent or the '784 patent.

¹ *In re Dow Chemical Co.*, 837 F.2d 469, 473, 5 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1988).

² '773 patent, Col. 2, lines 43-49.

³ '773 patent, Col. 1, lines 58-63.

The '144 patent teaches stitching together laminate sheets that are impregnated with a high fracture toughness resin that resists microtears.⁴ The stitching enhances the interlaminar shear resistance of the band.⁵ The "significant aspect" of the teaching of the '144 patent is "co-curing the band with the tire carcass."⁶ The '144 patent does not teach or suggest modifying the band element to incorporate the self-healing composition of the '330 patent or the '784 patent.

The '330 patent teaches a composite material containing a polymer, a polymerizer, a corresponding catalyst for the polymerizer, and capsules, where the polymerizer is in the capsules.⁷ The polymer is broadly described as any polymeric material into which the capsules may be dispersed.⁸ There is no teaching or suggestion that the capsules could be dispersed within a tire band element matrix. Furthermore, there is no teaching or suggestion that the capsules of the '330 patent could survive the normal rigors of processing and use to which a tire band element is subjected,⁹ and therefore one of skill in the art of tires would not, upon reading the '330 patent, envisage a reasonable chance of success in modifying the teachings of the '330 patent to apply them to tire band elements.

The '784 publication, as discussed hereinabove, only generally suggests that self-healing compositions can be used in tire parts, and does not teach or suggest tire band elements. Tire band elements are completely distinct from what is normally thought of by one of skill in the art as tire parts, because they are not formed from vulcanizable elastomers, they are not compression molded, they are only present in specialized types of tires, and the chemical and physical properties are vastly different. Therefore, the '784 publication, while it generally mentions tire parts, does not teach or suggest to one of skill in the art that the self-healing composition of the '784 publication could be used in tire band elements.

None of the cited references suggest the process of claim 2, where a tire band element is formed by a process comprising the steps of providing a tire band element matrix; encapsulating a reactant to form microcapsules, where the reactant is capable of

⁴ '144 patent, Abstract.

⁵ '144 patent, Abstract.

⁶ '144 patent, Col. 5, lin3w 20-30.

⁷ '330 patent, Col. 1, lines 52-55.

⁸ '330 patent, Col. 5, lines 21-25.

⁹ See Applicants' specification, page 4, lines 14-16.

undergoing polymerization within the matrix; selecting a reaction facilitator capable of facilitating the polymerization of the reactant; and adding the microcapsules and the reaction facilitator to the tire band element matrix. It appears, therefore, that in combining the cited references, the Examiner impermissibly relies on hindsight. It is a basic tenet that, when applying 35 U.S.C. § 103, the references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention.¹⁰ The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure.¹¹

The Examiner has failed to establish a *prima facie* case of obviousness, because there is no motivation for one of skill in the art to combine the references with a reasonable expectation of success.

New claims 4-23 have been added to further define Applicants' tire band element invention, and are believed to be patentably distinct over all of the cited references, alone or in combination. For example, new claim 9 recites that the band element is prepared by a method comprising homogeneous filament winding, non-homogeneous filament winding, multilayer tape composite winding, winding with prepreg materials, winding with wet woven materials, winding with mats, winding with resin transfer molding processes, winding with wet or prepreg woven performs, or combinations thereof. None of the cited references teach or suggest a process for forming tire band elements comprising adding microcapsules and reaction facilitator to the tire band element matrix and preparing the band element by the above methods.

Also, new claim 20 recites that the microencapsulated reactant is encapsulated with two or more different types of shells, where each type of shell is characterized by a different strength and ease of rupture. None of the cited references teach or suggest a tire band element comprising multiple types of shells having different strengths and ease of rupture.

Furthermore, new claim 22 recites that the tire band element further comprises a viscoelastic coating, which is not taught or suggested by any of the cited references. And, new claim 23 recites that the coating comprises microencapsulated reactant and reaction facilitator.

¹⁰ *In re Dembiczak*, 175 F.3d 994, 999, 50 U.S.P.Q.2d 1614, 1617 (Fed. Cir. 1999).

CONCLUSION

In view of the foregoing amendments and arguments presented herein, the Applicants believe that they have properly set forth the invention and accordingly, respectfully requests the Examiner to reconsider the rejections provided in the last Office Action. A formal Notice of Allowance of claims 2-23 is earnestly solicited. Should the Examiner care to discuss any of the foregoing in greater detail, the undersigned attorney would welcome a telephone call.

One claim has been cancelled, and 20 new claims have been added for a total of 22 claims. The undersigned attorney hereby authorizes the Commissioner to charge payment of any fees associated with this communication or to credit any overpayment to Deposit Account No. 06-0925.

Respectfully submitted,



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¹¹ *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991).